

INDUSTRY

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TABLE 98. WORKSHOPS IN 453 VILLAGES, 1931

	<i>Shops</i>	<i>Workers</i>	<i>Output</i>	<i>Price¹</i>	<i>Per Cent Gain</i>	
	<i>Cotton Ginning, Spinning, and Weaving</i>					
Ginning ²	316	1,244	\$1,811,840		6	438
	316	1,244	1,811,840			258
						328
						326
						381
						438
	<i>Food</i>					
Flour mills ²	251	599	215,150	\$ 0.07 ³	14	
Oil, cotton seed ²	107	371	70,500	.11 ³	14	
—, peanut	—	—	79,170	.16 ³	—	
Wine	3	28	36,620	.17 ³	7	
	361	998	401,440			
	<i>Wood and Bamboo</i>					
Bamboo implements	1	5	5,000		17	
Bellows	2	4	720	4.00	30	
Boxes and wardrobes	34	120	21,380		26	
Carts	61	207	55,080	62.00	13	
Frames	1	6	640		37	
Timber yards	614	3,205	290,620		17	
	713	3,547	371,440			
	<i>Metal</i>					
Blacksmith	20	62	6,590		32	
Brass	1	2	700		30	
Cotton batting machines	2	10	5,360	40.00	8	
Iron goods	3	32	23,660		—	
Iron parts of plows	1	11	500		33	
Pewter	2	8	700		47	
Tin	1	3	210		17	
Water wheels	18	168	79,160	89.00	10	
Water wheel buckets	8	26	10,000	1.10	18	
	56	322	126,880			
	<i>Chemical</i>					
Brick yards	73	1,105	154,060		11	
Dyeing ²	23	81	43,400		19	
Earthen vessels	2	28	9,750		22	
Paper	7	38	17,200		24	
Tanning	7	19	4,860		24	
Tiles	4	63	9,930		46	
	116	1,334	239,200			

(continued on next page)

TABLE 103. VILLAGE HOME INDUSTRY: METALS

	Villages	Families	Males	Output	Price ¹	Per Cent Gain
Corn removers	1	1	2	\$ 140	\$ 0.01	30
Horse shoes	1	1	3	680	.15 ²	27
Kettles	1	1	1	200	-	40
Lanterns	1	1	1	200	-	30
Locks	1	2	4	1,010	.10	10
Looms	1	1	2	500	28.00	27
Rakes	1	1	1	30	.40	25
Razors	1	1	3	380	.18	22
Vegetable cutters	1	3	6	410	.12	25
Wire lanterns	1	2	3	70	.15	66
{ Wire scoops ³	1	12	25	22,800	.125	17
{ Wire horse muzzles	-	-	-	210	.07	-
{ Wire mouse traps	-	-	-	400	.04	-
	26	51		\$26,770		

¹ Each, except as indicated.² Per set.³ Items bracketed were made by the same family.

TABLE 104. VILLAGE HOME INDUSTRY: CHEMICALS

	Villages	Families	Males	Females	Output	Price ¹	Per Cent Gain
Candles	2	4	21	-	\$ 4,720	\$0.18	44
Firecrackers	9	64	164	56	12,920		37
Glue	1	6	15	-	6,440	.33	15
Incense	2	19	75	30	9,370	.03 ²	17
Leather	3	3	12	-	4,860		19
Matches	1	7	9	5	280	.04	63
Paper, black	1	5	8	5	530	3.30 ³	38
—, ko pei	1	16	80	-	11,430	1.43 ³	11
{ —, straw ⁴	2	13	55	-	2,560	.05	50
{ —, tinder	-	-	-	-	140	.41 ³	
Soap	9	28	32	9	3,360	.74	26
Toilet preparations	1	1	6	-	1,800 ⁴	—	37
Face powder	2	7	12	-	400	1.10	49
	173	489	105		\$58,810		

¹ Per catty, except as indicated.² Per bundle.³ Per 1,000 pieces.⁴ Items bracketed were made by the same family.⁵ Toilet preparations:

Cosmetics	\$ 500	\$0.10 per bottle	Cologne	200	.20 per bottle
Pomatum	450	.15 " "	Tooth powder	80	.02 " bag
Perfume cream	330	.07 " "	Total	\$1,800	
Talc powder	240	.16 " box			

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8: Lin E-5 (1927)1928 AF12 North China AF12

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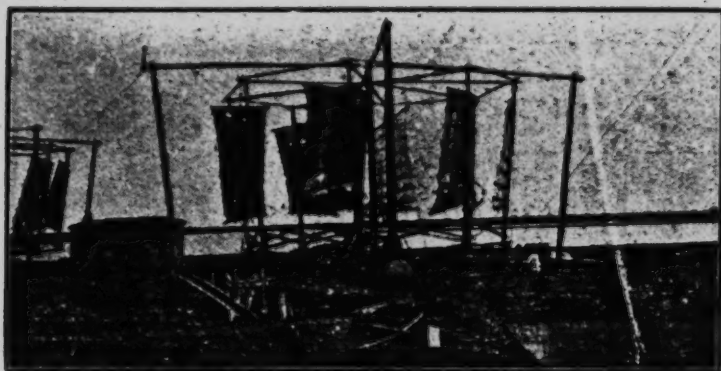
久大精鹽公司總廠



Jintan Salt Refining Co., Ltd., Manufacturing Plant,
Tanghu.

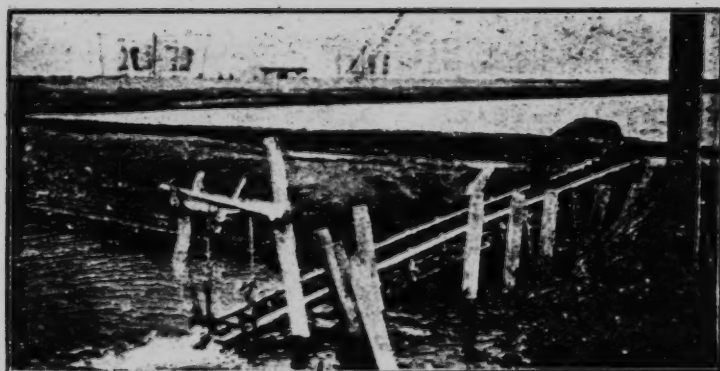
[P. XIII]

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SAIL WINDMILL
PUMPING SEA WATER INTO THE SALT FIELD



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CHAIN-PUMP
FLOODING THE SALT FIELD WITH SEA WATER

[Facing p. 8]

CHAPTER II

THE CHIU TA SALT REFINERY AND ITS WORKERS

I. GENERAL FEATURES OF THE COMPANY

381 Its Origin and Development.—In the early years of the
 258 Republic, the Chinese government realizing the necessity of
 improving salt manufacture in this country, appointed a
 special commission headed by Mr. S. T. Fan to study salt
 industry and administration in the various countries of Europe.
 Upon his return in 1914, Mr. Fan engaged himself to promote a
 salt refining company and chose in Tangku, where salt fields
 abound, a site for the factory. As free manufacture of salt has
 been prohibited in China, a permit had to be obtained from the
 Salt Administration for this purpose. The permit was duly
 granted and in 1916, the first factory for refining salt in China
 came into existence at Tangku. The capital of the Company
 originally subscribed was only \$50,000 (silver); but it was later
 increased in 1918 to \$500,000 and in 1926 to \$2,100,000. In
 1920, a special privilege was granted to the factory by the
 Salt Administration to the effect that within 100 li of the
 factory, no other salt refinery was allowed to operate. In this
 way the profits of the promoters of the Company have been
 safeguarded.

Organization of the Company.—The business of the
 Company is carried on by a general manager. He has under his
 control four departments and two subsidiary organizations. The
 former consists of the Business Department, the Accounting
 Department, the Manufacturing Department and the Managerial
 Department. The first two departments are located in Tientsin,
 while the last two in Tangku. The head of the Manufacturing
 Department serves concurrently as the manager of the factory and
 the two chiefs of the Managerial Department divide their duties

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REMOVING REFINED SALT



TWO TANK WASHERS

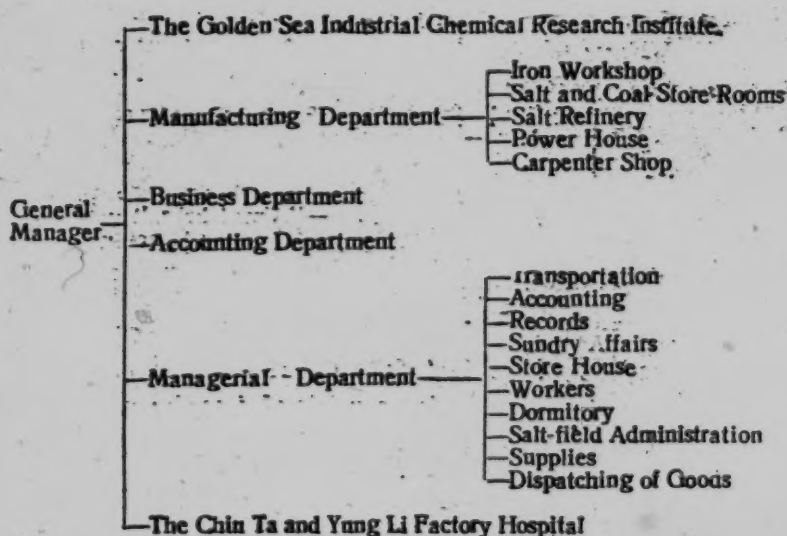
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in looking after the east and the west sections of the factory. 381
 The two subsidiary organizations, (1) the Golden Sea Industrial 258
 Chemical Research Institute and (2) the Hospital, are attached to
 the factory, but they are autonomous in the matter of internal
 administration and the disposal of funds. The Research Institute
 was originally a chemical laboratory of the factory, but has since
 developed into an independent institution, supported with the
 funds donated by Mr. Fan, the General Manager of the Company
 who serves as the Director of the Institute. There are at present
 one department head and three research fellows actively engaged
 in industrial research work. It is true that the institute never
 had sufficient funds nor sufficient men on its staff, yet it must be
 said that it had already accomplished several highly useful and
 interesting projects along the line of chemical industry. At
 present, the research fellows are working on a method for the
 extraction of ephedrine and have attained a considerable degree
 of success. The hospital forms a part of the welfare work of the
 Company and it will be more fully treated in Chapter III.

The following diagram will give a clear idea of the
 organization of the Chin Ta Salt Refining Company:—

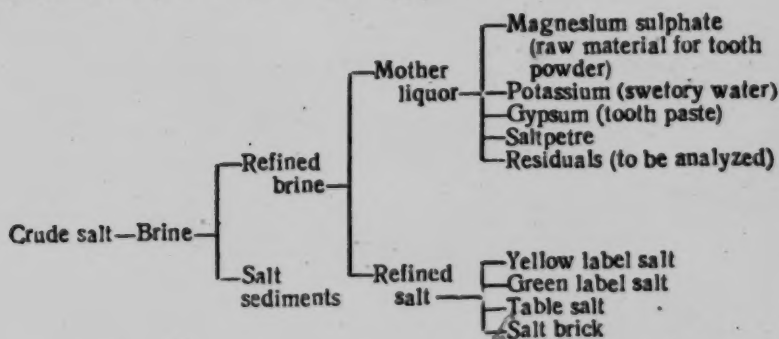


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The Manufacturing Process.—The process of refining salt is rather a simple one. First, lumps of crude salt are dissolved in a ten-foot deep tank. The brine water in the tank is then filtered through sand and let flow into another tank containing a little lime so that iron compounds will be precipitated. It is next pumped into a high tower and then from the tower into a rectangular iron vat and is heated until it reaches 109° C. As the water gradually evaporates, white crystals of salt are formed. The mother liquor is then drained off through filtration. The crystals are then spread and dried on a huge *kang*¹ heated underneath, and ground into fine powder by means of a stone roller. After going through an electric sieve, the refined salt is then ready to be put into bags and sent to the market for sale.

The mother liquor which has been left over from salt-making contains many chemical compounds from which can be extracted saltpetre, magnesium-sulphate, gypsum and potassium. By mixing them with other ingredients, swetory water, tooth paste, tooth powder, magnesium carbonate and other articles are produced. The different processes of manufacturing salt will be made clear by the following diagram:—



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258 **The Production of Refined Salt.**—The supply of crude salt in the two sections of the factory is drawn from two different sources. The east section which consists of two shops depends on the six salt fields of its own to supply the raw material. The

¹ An oblong block of brick masonry.

THE CHIU TA SALT REFINERY

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west section which consists of four shops has to buy crude salt ²⁵⁸381 • from Hanku, Shin-ho and Tangku. Tangku, which lies in the ^[317]Chiang-Lu salt monopoly district, has always been rich in salt production. With such conveniences as easily accessible water and railway communications, supply of raw material and transportation of manufactured goods at Tangku have been greatly facilitated. If the demand for refined salt is constantly increasing, the factory can easily work to the fullest capacity of its six shops. But unfortunately unstable and chaotic conditions which China has undergone in recent years have rendered the factory difficult, if not entirely impossible, of operation, not to say money-making.

The output of the two sections of the factory varies somewhat in amount and also from day to day. Because of the varying degrees of efficiency among the workers, due undoubtedly to a number of causes, no definite amount of production could be ascertained. But it has been fixed by the factory authorities that each vat should turn out from 120 to 180 bags per day, one bag weighing 150 kilograms. And according to the report of the chief of the managerial department, the maximum daily output has been 1,200 bags in the four shops in the west section and 800 bags in the two shops in the east section of the factory. The total output of these six shops, therefore, amounts to about 3,000 piculs¹ per day or about 1,080,000 piculs per year. On account of the unsettled conditions in the country which have resulted in frequent suspension of the work in the factory, the average amount of output has been reduced to 600,000 piculs a year. The sale of these 600,000 piculs of refined salt is left to the business department of the Company at Tientsin.

It may be recalled that the salt revenue of the Chinese ³⁸¹government has been pledged as security for the Reorganization ⁶⁵¹Loan of 1913, and the transportation and sale of salt has since ²⁵⁸then been put under the supervision of the Salt Inspectorate. Consequently, the amount of crude and refined salt bought and

¹ One picul is equivalent to 100 kilograms.

381 sold by the factory must, first of all, be reported to the Inspec-
 651 torate and duties thereon paid accordingly. Upon the receipt of
 258 the duties, permits are issued enabling the salt to be sold or
 disposed of in the designated areas. The payment of salt duties
 differs in the two sections of the factory. In the four shops of
 the west section, the duty on crude salt is paid before it is taken
 into the factory and another duty is paid again, when it is refin-
 ed. In the two shops of the east section, however, salt is directly
 shipped from the fields to the factory store and the two duties
 are paid in a lump sum, when refined salt is made. Further,
 while the refined salt of the west shops may be deposited in the
 factory store house, that of the east shops must be deposited in
 store houses designated by the Inspectorate. An agent of the
 Chiang-Lu District Salt Inspectorate has an office near the Rail-
 way Station for collecting the duties and supervising salt
 381 removals. A large quantity of refined salt produced by the
 438 Chiu Ta Factory is shipped to Tientsin, Shanghai and other
 258 places, as the sale is limited only to trading ports. On account
 of this restriction, the interior of China is denied the use of this
 refined salt, unless it is sold by merchants who possess the right
 of exclusive sale of that place. It has been estimated that Tien-
 tsin and Shanghai take only 30 per cent of the annual production
 of the Chiu Ta Factory, while the remaining 70 per cent is
 largely absorbed in Hankow and Kiukiang.

381 The Place of the Chiu Ta Refinery Examined.—The Chiu
 258 Ta Salt Refinery is a pioneer organization in this country in
 developing the salt refining industry and improving the quality
 of salt. Since its formation in 1916, all salt merchants have
 begun to realize the importance of salt refining; and within a
 period of less than eleven years, salt refineries have been estab-
 lished one after another in several coastal towns. As a con-
 sequence, the importation of foreign salt which has always been
 duty-free has somewhat diminished. Further, the technical
 experts of the Refinery have from time to time made improve-
 ments in the process of salt refining. There is no doubt that
 the Chiu Ta Company has performed a unique service in develop-

THE CHIU TA SALT REFINERY.

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ing the salt industry of this country.

In addition to the improvements of salt refining, the staff of the Research Institute has also worked out valuable results regarding the industrial uses of salt. Two industrial concerns, the Pacific Alkali Works and the Po Hai Chemical Works, may be said to be the offshoots of the Research Institute in that both are making use of the results of its research and are developing them along commercial lines.

It should be pointed out that the supply of crude salt produced in Tangku and its neighbouring districts has always been in excess of its demand. Take Hanku for an example. Its productive capacity per year has been 4,000,000 piculs, while only one-half of it is actually sold. The sheer waste attendant upon salt production in this country is certainly astonishing. It has also been estimated that 800,000 piculs of mother liquor, an important by-product of salt have been thrown away every year without any recognition of its value. If the Research Institute could continue to work on the industrial utilization of salt, as it has already done in making possible the establishment of the two companies—the Pacific Alkali Works and the Po-Hai Chemical Works—it would not only help solve the problem of turning to good account the enormous amount of salt which would otherwise be wasted, but also confer an enormous benefit on the multitudes of salt producers throughout China by giving them livelihood.

The town of Tangku has experienced during the last thirty years several vicissitudes. The year 1898 marked the beginning of a phenomenal growth, for in that year the riverway leading from it to Tientsin was blocked by silting to such an extent that steamers of over one thousand tonnage had to lay anchor at Tangku where loading and unloading of goods were effected. The town at once found itself flourishing and prosperous, for what had been originally a mere outer port now became the only important gateway of North China. In 1900, however, came the Boxer Uprising. Being the main entrance to Tientsin and Peking,

¹ Now changed to Peiping by order of the Nationalist Government.

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and experience of a technical nature. Apprentices are employed 463 from time to time by the factory to be trained by skilled labourers. The term of apprenticeship is three years; but at the end of every year, they are examined. When the term of apprenticeship expires, they are promoted according to merit to the skilled class. The workers of the power house and iron workshop are regular 464 labourers of the factory, but in the carpenter shop, apart from the regular labourers of the factory, additional labourers are occasionally employed for short periods in busy seasons. These labourers are paid daily and their number is determined by the amount of work required in the factory. Masons and coolies are also employed from time to time and paid daily. These three classes of workers together with the coolies and servants of the Golden Sea Industrial Chemical Research Institute and of the Hospital are not placed on the permanent list of workers of the Chiu Ta Factory and, therefore, they do not fall within the scope of our investigation.

Workers in the factory are not graded into definite classes. 381 For instance, a worker may be assigned to direct other workers, 466 in order to speed up their work, but he is not supposed to be their foreman. In fact, no such title is known in the factory. He 258 who directs the workers is given authority only during the working hours, while at other times, he is but one of their equals. All the workers have access not only to the administrative staff, but also to the chief of the managerial department. In case of any difficulty arising between the management and the workers, the chief of the department would interview the workers and exchange opinions with them. In this way, disputes, if any, are easily and amicably settled.

The factory is divided into six sections: (1) the west section of the refinery, (2) the east section of the refinery, (3) the iron workshop, (4) the power house, (5) the dormitory and (6) the salt field administration. Workers of the last four places are under the direct control of their respective administrative staffs, while workers of the salt refinery are under their own supervisors. At the end of every month, the workers are graded

FACTORY WORKERS IN TANGKU

381 according to their efficiency into three classes: superior, medium,
466 and inferior, and reported to the managerial department by the
258 supervisors who are on the staff of the management. Increase of
salary, distribution of bonus and dismissal of workers are all
based upon this report. The chief of the managerial department,
whenever he finds it necessary, conducts a personal investigation
of the workers, so that no injustice is intentionally done to any body.

381 Number of Workers.—The number of workers in the factory
258 varies from time to time and is determined by its business conditions. In the prosperous year of 1925, there were 660 workers. During these years of general unrest and business depression, however, the number of workers has been reduced to about 500. The factory records of April 20, 1927, show that the number of workers was 556. They were distributed in the various sections of the factory as follows:

Table 1.—Number of Workers in the Various Sections of the Factory

Section	Number of workers	Per cent
West Section.....	262	47.1
East Section	207	37.2
Iron Workshop	45	8.1
Power House	15	4.0
Dormitory	22	2.7
Salt Field Administration	5	0.9
Total.....	556	100.0

The workers may also be classified into the skilled and the common thus :—

Skilled labourers	75	13.5%
Common labourers	481	86.5%

464 Length of Employment of the Workers.—Table 2 shows the distribution and percentage of the 556 workers according to their length of employment in the factory. As a rule, the number of workers varies in inverse proportion with the number of years:

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of workers does not require any publicity, as once the news is known to the workers, the latter would introduce their acquaintances and friends who were looking for work. The applicants are given a physical examination and their age must be around twenty. If the above requirements are met and on furnishing a guarantor as well as expressing their willingness to observe the regulations of the factory, the workers are admitted. They are usually discharged on the recommendations of the supervisors in February and July, but more frequently in July. On the average, the number of dismissals is around 20 a year. In recent years, however, it has decreased considerably through better management. From July 1926 to June 1927, only five workers were dismissed in the east section. Those who quit for family reasons or out of their own will are usually about 20 a year. The occupations the workers follow after leaving the factory are said to be as follows: farming 60 per cent, small business 20 per cent, other kinds of work 20 per cent. 464

The work of the common labourer is subject to frequent changes. Even the skilled labourer is only confined to tending the electric plant or making spare parts for simple machinery. As the work of salt refining is of such a nature that only strength and endurance are required, repetition of the same work does not necessarily give rise to efficiency. Thus, in the factory, change of work is a rule rather than an exception. It is unfortunate that we are unable to analyse the change of jobs among the workers, as the records concerning it are not accessible. What we could secure is limited only to the change of workers. According to a statement made by a chief of the managerial department, the annual rate of replacement is about 8 per cent of the total number of workers in the factory i. e. the number of dismissals and admittances is about 40 each a year. But it seems that on account of the irregularity of work in the factory during the last year, the rate of turnover must have been still higher.

Different Kinds of Work.—The work in the Chiu Ta Factory 463 may be divided into the principal and the subsidiary. The 381 principal part of the work is confined to salt refining. The

463 subsidiary part of the work that is, any work other than salt
 381 refining, is rendered by both skilled and unskilled labourers. The skilled work includes the manufacturing of iron and wooden implements and the operation of the electric plant, while the unskilled work consists in transporting and storing products and other miscellaneous work including service and attendance. A detailed list of the various kinds of work is shown in Table 4.

466 The work, as a whole, is of a safe nature, and does not involve any serious danger to life. The principal work, which consist of dissolving, boiling and baking salt, carrying coal, attending to the furnace and washing salt tanks, requires physical strength. Workers with a weak constitution are liable to fall ill, especially in winter and summer. For instance, the salt boiler is apt to catch cold, after emerging from the heated room, as he has profusely perspired after serious exertions. The work of the firemen, though uncomfortable enough in summer, is rather light as compared with that of other workers. In the work of baking salt, its smell is choking. In summer the hot kang makes the temperature in the room unbearably high. This may be one of the reasons why salt bakers very frequently ask leave of absence in summer. Washing salt tank must be an unpleasant job in winter, as the hands of the worker constantly exposed to the icy cold salt water, are apt to get chilblains. There is, however, one advantage in these kinds of salt refining work, as none require continuous hard work and workers may rest at intervals.

Working Hours.—From 1916 to February of 1927, the common labourer worked 12 hours and the skilled labourer, 10 hours a day. But the eight-hour day has been adopted, since March 1927 in all kinds of work, excepting those to which the system cannot very well apply. In accordance with the nature of the work, labourers have been arranged in shifts. For the salt refining work, for instance, three shifts of men are necessary, but the blacksmiths and apprentices have only one shift, who work from 8 to 12 in the morning and 1:30 to 5:30 in the afternoon. The

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Table 4. Working Hours of Various Kinds of Work in the
Factory

	Kinds of work	Number of shifts	Hours per Shift
Principal work	Salt-boiling	3	8
	Salt-baking	3	8
	Firemen	3	8
	Salt-dissolving	2 or 3	8
	Pulling coal carts	1, 2 or 3	8
	Tank-washing	1	8
Subsidiary work	Firemen (power house and steam Engine)	3	8
	Electric plant	1	8
	Iron workshop	1	8
	Carpentry	1	8
	Store room	1	8
	Recorder	1	8
	Supply department	1	8
	Sundry jobs	1	8
	Bath room	1	10
	Tea kettle keeper	2	12
	Cook	2	12
	Watchman	1, 2 or 3	6, 8 or 12
	Dispatching goods	1	indefinite
	Servant	1	indefinite

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three shifts are divided as follows: (1) 6 a.m. to 2 p.m. (2) 2 p.m. to 10 p.m. and (3) 10 p.m. to 6 a.m. A change of shift is effected once every week by switching the first shift to the third and the second to the first; this would allow men in the first shift to rest 32 hours, known as "the big rest" and men in the second and third shifts to rest eight hours. The two shifts are divided between (1) 6 a.m. to 2 p.m. and (2) 2 p.m. to 10 p.m. Exceptions to the eight-hour day are found as follows:

- (1) 12-hour day; the change of shift being made twice at 6 a.m. and 6 p.m.